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Changing landscapes of the Yukon and Mackenzie areas.

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CHANGING LANDSCAPES OF THE YUKON AND MACKENZIE AREAS*

William C. Wonders
University of Alberta

A changing landscape is a condition which most Canadians accept increasingly as a part of their daily life. It is viewed sometimes with nostalgia for a more leisurely past era, sometimes with pride as evidence of modern progress, and sometimes with frustration for the blunders committed in the name of progress. Many a southern Canadian finds exhilaration in the near-explosive change of his urban environment pushing ever upwards and outwards. Farm lands too change crops and owners in the process of attaining an "economic size" for present-day conditions or as they await the anticipated arrival of the urban fringe. Yet through all this, whether viewed with nostalgia, pride, or frustration most Canadians see their North as a land still essentially untouched. There man is still the interloper in a landscape little altered from its earliest days. Such a situation is attractive to all--for the nostalgic it provides an escape to a lost tranquility, for the ambitious it provides a challenge to rich rewards, and for the frustrated it provides the opportunity of a second chance for an improved future.

The Canadian North does provide a landscape wherein man's imprint is often still minimal. At the same time it offers striking evidence of change in a variety of aspects which are all the more remarkable for the relatively small local population directly involved. The impact of these changes, moreover, often has been of regional and national importance as well as local.

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The Yukon and Mackenzie Areas constitute a large part of the Canadian Northwest. This latter term is vaguely defined though in frequent usage. It may be thought of as including those areas north of the C.N.R. transcontinental railway line, and lying east of the Alaskan boundary. Its eastern margin marks the limits of accessibility from the Mackenzie River system. For purposes of this paper the limited areas of contiguous agricultural settlement of the southern marginal areas and in the Peace River area are excluded. The Canadian Northwest thus takes in parts of the provinces of British Columbia, Alberta, and Saskatchewan but its major portion falls within the Yukon Territory and the Mackenzie District of the Northwest Territories.

Ten years ago the Royal Society of Canada meeting at the University of Alberta, chose as the theme for its symposium "The Canadian Northwest: Its Potentialities." Without wishing to be repetitive, the summary of the physical features of the area made at that time, is perhaps as brief as possible for those persons with little background knowledge of the Northwest, and is as valid here in an examination of the changing landscape, as it was then in evaluating the resource potential:

> "Within the area thus defined there is great diversity, especially in terrain. The three major physiographic elements in Canada are all represented, effecting at least a threefold internal subdivision with significant differences in resources as well as in appearance and living conditions. In the east it includes an appreciable area of the Canadian Shield, that lake-strewn rocky surface of low relief. On its thin and sandy soils stunted conifers and birches form only

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a scrub growth in most areas. The line of contact with the Interior Plains to the west is marked by the three 'Great Lakes of the Northwest' - Great Bear, Great Slave, and Athabasca. The northward extension of the Plains differs from conditions farther south in the Prairie Provinces in its much more restricted east-west extent (varying from 200 to 400 miles within the area) and in its much lower elevations. Its most striking feature is the great Mackenzie River system which drains northward for over a thousand miles, whence is derived the name, Mackenzie Lowland, often applied to this sector. Generally, the lowland surface is poorly drained with frequent muskeg but the sector is extensively forested. Though many of the trees are small and slow-growing especially in the north, the Mackenzie Lowland includes the best forest stands in the Northwest Territories. The westernmost sector, including most of northern British Columbia and the Yukon, is part of the Cordillera region, the sector of greatest relief and landscape variety. A complex of rugged mountains and plateaux cut by deep valleys, many of which are tributary to the Yukon River system, produces a striking contrast to the other two sectors. Forests again are widespread particularly in northern British Columbia and in the southeastern Yukon. The mountain terrain and increasingly northern latitude, however, greatly restrict the forest areas of the Yukon." [1]

Man's arrival on this scene it now appears was amongst the earliest anywhere on the continent, yet for the bulk of time that he has been present his imprint on the natural environment has been slight. Hunting and fishing for his immediate needs, he traditionally moved over the vast area in small groups, with only a few midden heaps and campfire embers to mark his passing. In this first era of settlement, or perhaps of "human occupation", the landscape remained little modified from its original condition.

Exploration and the development of the fur trade resulted in the first modest change in the local landscape. Beginning with Pond's House on the lower Athsbasca River in 1778 and with Ft. Chipewyan on Lake Athabasca in 1789, small fur trading posts followed the explorers down the Mackenzie River system. In the Yukon Russian possession of the Pacific coast and the Chilkat Indians' fierce opposition to the inland movement of Europeans

delayed entry until the middle 19th century and the direct impact of the fur trade remained much less than in the Mackenzie. The trading posts introduced a new element into the landscape both culturally and physically, but except for such major posts as Ft. Chipewyan and Ft. Simpson, they were unimpressive in appearance and size, and indeed were shifted frequently in location. They did however, provide the original nuclei for most of the settlements which now mark the Mackenzie River waterway at approximately 150 mile intervals, from Ft. McMurray in the south to the Arctic coast. Except for trading visits the native Indian population remained scattered in distribution, and were encouraged in this by the traders who wanted furs, not neighbours. Thus tapping the wildlife resources for commercial purposes effected little change in the landscape. The one noteworthy exception was the Mackenzie delta. There in the later stages of the fur trade era, in the early part of the present century, the rich potential of the muskrat harvest encouraged an appreciable movement of people into the region and it became marked with numerous trappers' cabins along the incredible maze of waterways lacing the delta.

Two developments of the latter half of the 19-th century had particular significance for the Northwestern landscape, both immediately and in presaging an even greater significance during the recent and present period: missions began to appear in the area, and the Klondike Gold rush occurred. For the missions the trading posts provided the centres where the largest numbers of Indian inhabitants could be contacted, at least periodically through the year, and so churches were erected in the vicinity. Education was a natural second step. Government at the time was still defining its role in other,

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more "essential" areas, so that not only was there no blockage of church-sponsored education, there was encouragement and some financial support. Schools thus appeared on the small settlements. Since the parents still were absent over much of the year on the trap-lines, residences were erected to house the children. Hospitals likewise were introduced by the mission authorities. Europeans provided the more specialized services required, but appreciable numbers of Indians and Métis began to find employment with the missions. The isolated situation of these rudimentary communities and the high cost of very limited transportation meant that there was considerable incentive to produce as much foodstuffs locally as possible. The first real beginnings of agriculture in the area were associated with the missions. Vegetables and grains proved to a skeptical world that this part of the North at least, did provide agricultural potential despite its high latitude. Cows too were an important component of the mission farms, providing milk for the school children.

The missions thus were responsible for two changes in the landscape, which though local were nonetheless significant: they introduced what could properly be called farms*, and they were responsible for the first diversification of the European presence in the area providing the trading posts with a greater number and variety of buildings and with these a greater sense of permanency for the settlements. Oddly enough the relative importance of these two changes has been reversed in the course of the present century. The produce from mission farms was widely reported and the public had visions of a major new agricultural area in the Yukon and Mackenzie. It spurred the government to undertake scientific investigations into these possibilities. Yet in the

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main "essential" areas, as they not only use their own clientage of disadvantaged students, they may accomplishment and have financial support. Schools thus operated in the small centers. Place the problems still more acute; your need at one year in the term times, resources were wrested to house the children. Dormitory facilities introduced into existing institutions. Transport provided by more specialized facilities required, but appropriable numbers of teachers and their taken to that neighbour with the mission. The isolated situation of these residentary communities and the lack near of very limited transportation meant that there was considerable incentive to remain in such homecrafts towards a permanent. The first real beginnings of agriculture in the area were associated with the mission. Vegetables and grains proved to a sheepland world that this part of the north is fertile, its provide environmental potential despite its high latitude. Thus the area as important centrepoint of the mission farm, providing milk for the school children.

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past two decades there has been a declining interest in local agriculture as transportation has improved and as money has been more generally available for the inhabitants to purchase food. Mission farms have been allowed to fall idle except for the occasional potato patch, and the livestock has dwindled to the point that a cow again is the subject of widespread local interest. Scientific investigations have pointed up the difficulties as well as the opportunities in northern agriculture, and while specialized studies continue, the closing down of the agricultural experimental substation at Fort Simpson and the somewhat uncertain future of the one at Haines Junction reflect the waning significance of agriculture in the area. Its chief survival today is as a few specialized market gardens in favoured spots near some of the larger settlements. In contrast to agriculture, which played a more important role relatively, in the earlier part of this century, the broadened base of settlement which the missions began and the subsequent concentration of population has emerged as a most distinctive feature of recent and current settlement. The Government also contributed to the broadened settlement base in the present century with Mounted Police detachments, weather and radio stations, etc.

The Klondike gold rush which followed the original discovery on August 17, 1896, in the north-central Yukon is world famous. It was the culmination of a series of similar "rushes" which extended ever northward in the Cordillera area from the Cariboo and through the Omineca and Cassiar Mountains sectors. The miners therefore marked the first significant influx of Europeans into this part of the Northwest, from the third quarter of the 19th century. In most cases their impact on the landscape was fleeting as

they moved from one placer working to the next. Irregular heaps of river gravels and rotting tent frames or sagging log cabins mark their passing. The Klondike rush however had a more lasting effect on the landscape. It was far richer and larger than any other had been and sustained its momentum much longer even though many of the opportunists soon were lured off by reports of other dazzling prosperity. Few events in Canada's history have been as colourful or dramatic. This remote corner of the Northwest, hitherto almost totally unknown, became the subject of interest over the entire world. Within the year Dawson developed from nothing to become the largest Canadian city west of Winnipeg, and within two years mushroomed to a centre of 25,000.[2] The uninspired terrace at the junction of the Klondike with the Yukon River was transformed into a city which provided water, sewerage, electricity, and telephone services to its inhabitants. Public buildings were erected which even to-day are impressive. Paralleling the changed landscape of the city site, the mining hinterland also was drastically changed. Tree growth was largely removed to facilitate mining operations and to provide fuel and building material. Streams were diverted over long distances to provide the necessary water for recovery methods, and later for hydraulic washing. Entire valleys were re-shaped, hillsides laid bare in giant scars and valley bottoms harrowed with immense mounds of bare gravel.

To meet the needs of this unprecedented influx of Europeans into Dawson and the Klondike District a transportation system was established within a remarkably short time. The 110-mile White Pass and Yukon Railway

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* "Between 1897 and 1904, inclusive, more than $100,000,000 in gold was obtained from the placers of Klondike creeks." (Lothian)

was built from Skagway through forbiddingly rugged Coast Range mountains to Whitehorse at the head of river navigation. Below this point shallow-draft sternwheeler steamboats provided transportation to and from Dawson. The transportation system in itself modified the landscape and contributed new settlements such as those at Carcross and at Whitehorse.

The pattern of European settlement established in the Yukon some seventy years ago has remained the dominant one down to the present, though with modifications including a reversal in the relative importance of Dawson and Whitehorse. The Klondike rush was also significant in that it was really the last mining boom in the Northwest at least where the individual or small operator was able to see the prospect through from discovery to profitable production. Even so, the costs of sustained operation and improved transportation facilities were such that it soon passed out of his hands and into those of the large, well financed companies. Other mining developments occurred subsequently, of which the most significant were the silver-lead deposits of the Mayo district (1913) in the Yukon, the Norman Wells oilfield on the middle Mackenzie River (1921 and 1933), the Great Bear Lake radium and uranium district (1933), and the Goldfields and Yellowknife gold districts on Lake Athabasca and Great Slave respectively (1935). The latter three mining developments introduced new settlement nuclei of Europeans into previously uninhabited areas on the margins of the Canadian Shield. While remaining much more mining camps on the traditional "here to-day, gone to-morrow" atmosphere, like Dawson they did provide the basis for improved river transportation facilities, in these cases on the Mackenzie waterway system.

Transportation changes which had begun in the thirties, at least insofar as water and air services were concerned, were probably the most significant impact of World War Two in local landscape change. Not only was the pace of change accelerated to an unprecedented degree but the war also was responsible for an entirely new transportation focus in the introduction of extensive roads, particularly involving the Yukon portion of the Northwest. In the Mackenzie area the river transportation system was modernized, powerful diesel tugs and steel barges replacing the colourful but less efficient old sternwheelers, modern warehouses and transfer facilities speeding handling at break-of-bulk points, etc. Aircraft landing facilities were provided for the settlements down the valley. From Norman Wells, the focus of activity in this eastern sector, our first northern petroleum pipeline was laid through the mountains to Whitehorse. In the Yukon sector the change focussed on the extension and improvement of aircraft landing facilities between Edmonton and Alaska, but particularly on the construction of the 1500-mile Alaska Highway between Dawson Creek and Fairbanks through largely untouched wilderness.

It is noteworthy that these major transportation changes and related wartime developments were not initiated through any primary interest in the area itself, but rather to meet a military emergency elsewhere particularly in Alaska. Yet they have had immeasurable impact on the area ever since, and certainly have accelerated change in it in almost every aspect. For the Yukon and northeastern British Columbia an entirely new route of access and development was opened up, and in so doing rapidly shifted the focus of economic and political power away from Dawson to Whitehorse. In the Mackenzie sector repercussions were not quite as immediate or dramatic, but they facilitated

the change which has occurred in the postwar years.

One further aspect of World War Two should be noted. Its significance was not directly evident in a changed landscape, unlike a series of landing fields, roads, etc., but it has been perhaps just as important for the individual nothern resident. To an unprecedented degree, WorldWar Two offered the northerner (or the temporary immigrant) the opportunity of wage employment. Moreover, the very high wage rates reflected the small local labour pool as well as the remote location and often rigorous working conditions. Even unskilled labour could obtain appreciable cash income, and for the first time a significant number of the native Indian inhabitants could see an alternative to hunting and trapping.

The years since World War Two have seen the greatest change of all in every aspect of the Northwest, including that of the landscape. It is suggested that many of these have their origins in past eras, and their present-day appearance represents a culmination of past tendencies rather than totally new phenomena. The fur trade established many of the present settlement nuclei. Some of these have proved satisfactory for our modern era but as many or more have not. The missions provided the first broadening of the"Service base" of the communities which began to draw more people into the settlements both temporarily and permanently. (As noted previously their introduction of farming has not generally been followed by the broadening of theis "resource base" in recent decades.) The Klondike gold rush marked the real beginning of mineral production from the area, which did provide an alternative economic resource to fur but which has come to play as dominant a role in the 20th century as fur did in the 19th. It was responsible for the first large influx of Europeans into the area who brought with them concepts

of living fashioned in southern Canada. It, and the later mineral developments in the Yukon and Mackenzie areas provided new communities both in themselves and to supply the improved transportation services which they required. The Klondike also soon demonstrated that large, properly capitalized companies were needed to meet costs of production in the Northwest. World War Two provided greatly improved and expanded transportation facilities for the area including the introduction of roads. It offered wage employment opportunities for native peoples as well as for Europeans. It also showed that in a shrunken world, the hitherto isolated Northwest could be drastically affected by conditions and decisions made far beyond its boundaries.

Postwar changes in five fields have been particularly significant to the area both generally and specifically in their reflection in the landscape: there have been unprecedented extension and improvement of transportation and communication facilities, mineral production has been expanded greatly; additional resource development has occurred: tourism has become a significant factor; major changes have occurred in the structure of the settlement nuclei.

Everyone in Canada is aware of the importance of aircraft in combatting the great distances which characterize the nation. This is particularly true of the North. Perhaps nowhere else do the residents accept aircraft as casually as an integral part of their everyday life. Landing facilities have been improved and new terminals provided so that it is possible to-day to enjoy near-mainline services into the area by multi-engine aircraft. The larger communities in the Mackenzie area as far north as Yellowknife have daily service to and from southern points and the same is true as far as Whitehorse in the

Yukon. Beyond these centres service to Inuvik and Dawson is on a four day-a-week basis. Jet service was put into effect this past December between Edmonton and Yellowknife, reflecting the increased northern traffic. Travel time between these two points was thereby reduced from three and one half to two hours. Another air company has just announced its plan to specially adapt a large aircraft for charter passenger service to enable Yellowknife residents to enjoy holiday excursions "outside" at special rates! Such improvements provide increased local employment, help reduce the high transportation costs on at least some items, but particularly help reduce the northerner's feeling of isolation and resultant dissatisfaction.

The non-scheduled or "bush plane" service for which the area acquired international fame in the inter-war years, not only has survived but thrives. Whereas previously most of it was based on more southern centers, such as Edmonton, it now operates mainly from points within the area itself, feeding directly to and from the mainline service.* No point is too remote for these aircraft using wheels, floats, or skis, while for very specialized needs helicopters now also are available. One morning this past summer 36 float planes could be counted at the docks at Yellowknife at one time.

Perhaps even more than improvement in air transport, the coming of roads into the area has reduced the individual's sense of isolation in the Northwest, besides appreciably lowering the cost of transportation. The knowledge that he can "drive out" if he wishes has generally made for a more satisfied northerner whether or not he has actually done so - if he does not wish to drive himself there is regular bus service abailable. The demands for more roads and improvement of existing ones also have proved as incessant in

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* Air charter facilities within the area are available at Ft. Nelson, Watson Lake, Atlin, Whitehorse, Dawson, Ft. McMurray, Ft. Chipewyan, Uranium City, Ft. Smith, High Level, Hay River, Yellowknife, Ft. Simpson, Norman Wells and Inuvik.

Yukon. Service times depend on factors such as length of run, and on a day-to-day basis. Air service was not long after this most Canadian business and initiative, following the Canadian northern pattern. Travel time between these two points was thereby reduced from three and one half to two hours. Another air company has just announced its plan to operate a large aircraft for charter passenger service to Mackenzie Territories by using military surplus "Matilda" as special cargo. This Lockheed-type provide increased local employment, thus reduce the high transportation costs by at least some items, but particularly help reduce the northerner's feeling of isolation and remoteness.

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the Northwest as in any other part of Canada. From the Alaska Highway numerous other roads have been constructed, often to service mining centres such as Elsa, Dawson, Ross River, Flat River and Cassiar.* To the east the Mackenzie Highway has been built in postwar years north from Grimshaw in the Peace River Country, first to Hay River on Great Slave Lake and then around the west end of the lake to Yellowknife. Beyond this point some 40 miles already have been constructed on the Ingraham Trail towards the east end of Great Slave Lake. Lateral roads from the Mackenzie Highway now extend to Pine Point and to Fort Smith with its ties to the roads of Wood Buffalo National Park, with preliminary work on other extensions to Ft. Resolution and in the opposite direction, towards Ft. Simpson.** Ft. McMurray in the southeastern sector now is linked to the general net of Alberta highways.

The immediate economic impact of an all-weather highway was illustrated dramatically in Yellowknife where following the arrival of the road the price of milk dropped from 70 cents a quart to 37 cents and eggs from $1.00 a dozen to 60 cents. On a less personal level other major savings have been effected. A mine official reported that "without a doubt, the greatest effect the highway has had in the north is in the reduction of stores inventories at the mines and business establishments."[3] Trucks are forcing constant transportation adjustments through their competition. The base bulk point for handling air freight for the Mackenzie area has been pushed north from Edmonton to Hay River one month ago, with an integrated truck/air service from the south. The highway, with its right-of-way slashed across the countryside, its maintenance camps,

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* There are 1840 miles of year-round highway now in the Yukon Territory, and a further 230 miles of roads usable in summer only, plus 130 miles of "recreation roads" - Pers. Commun. A.A. Wright, Canada Department of Public Works, Whitehorse, 14 Feb. 69.

** There presently are some 1200 miles of roads within the Northwest Territories and 300 miles under construction which should be completed in the summer of 1969. For all practical purposes this is all within the Mackenzie District - Pers. Commun., S. Huculak, Canada Department of Public Works, Edmonton, February 14, 1969.

the Territories as in any other part of Canada. Then the Alaska Highway

[illegible] under truck haul [illegible] quantitatively, since no massive mining

[illegible] at Tulsa, Yukon, Fort Nelson. [illegible] Yet the east

the Mackenzie Highway for Fort Nelson is [illegible] miles north from Fairbanks to

the Peace River Country. Either the Dr. Nixon or Fraser River Lake and then

around the north end of the lake to Fallowdale. Beyond this point even if

[illegible] already [illegible] constructed on the Gravelbourg Trail [illegible] the end

end of Great Slave Lake. Natural route from the Mackenzie Stream [illegible]

to Fort Point and Fort Smith with [illegible] the [illegible] of [illegible]

Fort, with [illegible] [illegible] to [illegible]. Hamilton and in the

opposite direction, Pangnirtung [illegible]. Tuktoyaktuk [illegible] [illegible] to [illegible]

another [illegible] [illegible] [illegible] [illegible] [illegible] [illegible].

The Mackenzie Highway [illegible] of an all-weather highway was illustrated

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and [illegible] [illegible]. [illegible] are [illegible] [illegible]

[illegible] through their [illegible]. The base [illegible] point for [illegible]

freight for the Mackenzie area has been [illegible] from Fairbanks to Hay River

[illegible] year, with an [illegible] [illegible] service from the south. The [illegible]

with its [illegible] [illegible] [illegible] the [illegible], its [illegible] [illegible]

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* There are 1500 miles of gravel-surface highway for in the Yukon Territory, and a further 572 miles of [illegible] [illegible] to [illegible] [illegible], plus 137 miles of "[illegible] roads" - Pers. Commun. A.A. Wright, Canada Department of Public Works, Whitehorse 14 Feb. 69.

** There presently are some 1500 miles of roads within the Territories. Two [illegible] and 300 miles under construction which [illegible] is [illegible] in the summer of 1969. Our all [illegible] highway [illegible] in all [illegible] the [illegible] [illegible] - Pers. Commun., E. [illegible], Canada Department of Public Works, Whitehorse 21 [illegible] 1969.

service stations and garages, cafes and overnight accommodations is one of the most obvious changes in the landscape.

Winter roads are a more specialized feature of transportation within the area.[4] Introduced as long ago as the Klondike rush, they re-appeared briefly during the World War Two emergency in connection with the Canol Project, but they really have established themselves only within the past decade or so. They have replaced the 'cat-train' for most purposes within the area. Partly an outgrowth of oil exploration, they now have been highly developed on their own, and extend out in some cases for hundreds of miles during the winter freeze-up period. Such service was extended from Yellowknive into the barren lands itself, being the critical factor in bringing into production our first Arctic gold mine.

The railway has been present in the local landscape for some time in the southern periphery, in the form of the White Pass and Yukon Railway to Whitehorse, and the Northern Alberta Railway to Ft. McMurray. A major new northward penetration was effected in construction of the 432-mile Great Slave Lake Railway from Roma in the Peace River District to Hay River and to the Pine Point mining district. Not only did it make possible a large new mine in the latter area, it greatly enhanced the transportation role of Hay River, while seriously disrupting the pre-existing water transportation system on the Slave River. As with the roads, a new element appeared in the landscape and new employment opportunities were created in its construction. The use of Eskimo crew men at the Hay River terminal particularly has attracted much attention. Preliminary work is under way on a comparable northward extension of the Pacific Great Eastern Railway or perhaps the C.N.R. into northern British Columbia and perhaps the Yukon.

service [illegible] and [illegible], [illegible] and [illegible] accommodation) is one of the more obvious changes in the landscape.

Winter roads are a more recent feature of transportation within the area.[4] Introduced as long ago as the Klondike days, they re-appeared briefly during the World War Two emergency in connection with the Canol Project, but they really have established themselves only within the past decade or so. They have replaced the 'cat-train' for most purposes within the area. Partly an outgrowth of oil exploration, they now have been highly developed on their own, and extend out in some cases for hundreds of miles during the winter freeze-up period. Such service was extended from Yellowknife into the barren lands itself, being the critical factor in bringing into production our first Arctic gold mine.

The railway has been present in the local landscape for some time in the southern periphery, in the form of the White Pass and Yukon Railway to Whitehorse, and the Northern Alberta Railway to Ft. McMurray. A major new northward construction was effected in construction of the 430-mile Great Slave Lake Railway from Grimshaw in the Peace River district to Hay River and to the Pine Point mining district. Not only did it make possible a large new mine in the latter area, it greatly enhanced the transportation role of Hay River, with [illegible] [illegible] transportation [illegible] of the Slave River. As with the roads, a new element appeared in the landscape and new employment opportunities were created in its construction. The use of Indian crews at the Hay River terminal particularly has attracted much attention. Railways [illegible] as a possible northward extension of the Pacific Great Eastern Railway or perhaps the C.N.R. into northern British Columbia and perhaps the Yukon.

Water transportation facilities, the earliest in the area, have suffered severe relative retrenchment in recent years through competition from the newer media. In the Yukon all commercial river navigation ended in 1954. In the Mackenzie area the former unity of the system from Ft. McMurray to the Arctic coast has been split into two. Ft. McMurray now really only serves the Lake Athabasca area, while Hay River, thanks first to the road and then to the railway, has become the major shipping point for Great Slave Lake and downriver points. Despite competition, through modern more efficient service and a growing total demand for transportation in the Mackenzie, the amount of tonnage handled is increasing. Three new tugs and 24 new barges are currently under construction, which will raise the Northern Transportation Co. Ltd. fleet to 24 tugs and 240 barges.[5] The bustle of shipyards and the parade of tugs and barges up and down the great rivers will continue to be a part of the Mackenzie landscape for a considerable time to come.

Improvements in communications have gone hand in hand with those in transportation. In both cases much of the original postwar spur was due to defence considerations in the Cold War (DEW-Line, etc), but they have proved a great boon to mineral development and again to northern residents generally. A former important element in the structure of northern settlements, the 'Signals' (Royal Canadian Army Signals Corps) radio station has been displaced by more modern facilities. An intensive construction program in recent years has included building a 1000-mile land line the length of the Mackenzie valley, microwave towers along the Alaska Highway and along the Mackenzie Highway, and provision of a tropospheric scatter system to tie in the Arctic coast. The result is that four years ago the chief engineer for Canadian National Telecommunications was able to report that "the Yukon and Northwest Territories

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now have or will soon have the same communication services as the rest of the country with the exception of network television. Modern telephone and message telegraph service, leased wire telegraph, telex, facsimile and radio program network service are all available."[6] Perhaps no more telling commentary on communications in the Northwest can be made than to report that television is now available in such main centres as Uranium City, Yellowknife and Whitehorse! Increased demand for long distance telephone service for Yellowknife already has required its existing landline to be supplemented by a radio telephone system opened in January, 1969, and thereby doubling capacity, with provision for ultimate conversion to microwave transmission.

It is in the expansion of mineral production that the Northwest has made its greatest progress. It really is the only major economic resource of the area to date and probably will remain so. Some measure of its importance is suggested in the value of mineral production for selected postwar years. In 1945 the total value of mineral production in the Northwest Territories* was $1,039,525. By 1953 it surpassed ten million dollars for the first time: it passed twenty million dollars in 1954, dropped below twenty million again in 1961, in 1966 rocketed to over one hundred and ten million dollars, and was valued at $114, 261, 438 in 1967. In the Yukon the 1946 total value of mineral production was $1,693,904. Value of production exceeded ten million dollars for the first time in 1952 but in only two years since exceeded sixteen million dollars. In 1967 total value of production was $14,700,071. The figures[7] suggest the increasingly great impact which the mining industry has for the area through direct employment, services, and taxation returns.

Emphasis in production has varied. Gold, the traditional lure for northern mining, has remained the main base in the Yellowknife area and its

* Essentially all mineral production to date in the Northwest Territories has been from the Mackenzie area. The one exception was the nickel mine at Rankin Inlet which was in production 1957-1962 (incl.) with an average value of annual production of about two and a half million dollars.

expansion there immediately after World War Two sparked the development of the "new town" beyond the original camp or "old town". Tundra mine closed in 1967, Discovery will close in 1969, and with severe economic squeeze due to the fixed gold price the role of gold in the general production total has been declining. The same has been true in the Yukon, where the last gold dredge in the Dawson area ceased operations in 1966, although a new gold and silver mine started operations at Carcross in 1968. Uranium continued to be mined at Port Radium until it was exhausted; it supported the development of a major mining area and entire new town at Uranium City in the fifties but with the closing of the U.S. market it and the region dependent on it entered a semi-dormant condition. New mineral production has included tungsten (Flat River/Tungsten), asbestos (Cassiar, Clinton Creek), and copper (Whitehorse), with a renewal of silver production at Port Radium. The most significant single development has been the large scale lead-zinc mine at Pine Point which was responsible for the great surge in value of mineral production from the North-West Territories recently. The Yukon expects a similar result from the huge Anvil lead-zinc mine now nearing production 40 miles from Ross River. Meanwhile the prospecting rush for minerals generally in the Northwest is setting new records with field parties widely scattered over the landscape. 1968 was reported the greatest staking year in the Yukon since the Klondike[8] and such immense new ore bodies as the Crest iron ore field in the northeast are undergoing feasibility studies. In the Mackenzie area the copper prospects northeast of Great Bear Lake in the Coppermine area have been particularly encouraging and have resulted in what the regional director of resources believes sets an all-time Canadian record for claims filed.[9]

This is not the place to detail the individual mines, but in their impact on the landscape one may note that there is considerable variation from

the generally isolated mine with an adequate but basic camp for its workers (such as Tundra Gold Mine was), to another which may provide more varied facilities including married quarters (such as Cassiar or Elsa), to another which is sufficiently large yet relatively isolated to encourage establishment of a small town site (such as Pine Point), to those where the conditions favour several mines and a larger town site can service these and exempt the mining companies from having to assume many non-mining responsibilities (such as Yellowknife, Uranium City, or Ft. McMurray).

Though petroleum was really the first commercial mineral product of the Mackenzie area (Norman Wells production dating from 1920), it did not really come into significant production until the mines began in the 30's, with a particular surge in the World War Two emergency. It resulted in a new, specialized settlement, and facilitated other developments in reducing transportation and fuel costs in the area. In the postwar years oil exploration activity has surged northwards following the major Alberta discoveries. This has been primarily along the extension of the Interior Plains in the Mackenzie valley and most recently even out in the Arctic Islands. While 39 years elapsed between the first well at Norman Wells and the drilling of the first well north of the Arctic Circle (Grandview Hills, northwest of Fort Good Hope), there was a gap of only two years until the first well was drilled 600 miles farther north in the Arctic Islands in 1961. (Winter Harbour, Melville Island). To date actual production is limited to the southern part of the area in northeastern British Columbia and northwestern Alberta, where it has created the new settlement of Rainbow Lake, but drilling continues down the valley to the delta, and there also have been wells sunk in the Eagle Plains sector of the north central Yukon.

The generally isolated site also an economic one which, now for the mining (such as Tambo Grande) this year). In another sense, our recently some special facilities including material systems (such as Cerro de Pasco). In another sense in political- there was relatively isolated in economic monopoly of a small town site level on flat ground. In these sites the population (about several mines and a larger town site can service these and except the mining companies from having to assume their responsibilities (and in Huancayo, Santa Cruz, or Tr. Moscoso).

Three patterns can realize the first commercial stage: because in the Pacasmayo area (Cerro Negro production begins from 1960), in all are results some less significant production until the mine takes in 1974, with a particular source in the World for the company. It resulted in a new, specialized occupation, and facilitated other development in reducing transportation and fuel costs for the area. In the greater zone all exploration activity has moved northwards following the major Andean discoveries. This has been primarily along the extension of the Tambo Plata in the Tambo valley and most recently even out in the Arctic Tundra. Until 1? years ago between the first well at Cerro Negro and the building of the first well north of the Arctic Circle (Swanson Fill), minimum of four time span, there was a gap of only two years until the first well was initial (at Lake Fairbank north in the Arctic Islands in 1?1, Prince Patrick, Vanvik Island). In this actual production is limited to the northern part of the area in northeastern Alberta Cabinda and northwestern Alberta, where it has created the new settlement of Fairbank Lake, but facilities continue that the valley to the Mills, and these also have been well done so the Cabin State source of the north central Tambo-

Even the exploration phase of the work plays a significant role in the area. Seismic lines and access roads criss-cross the landscape and have opened up new sectors to truck transportation in many cases. Though the crews are usually self-contained and mainly supplied directly from more southerly points there are significant benefits to local communities. This has been particularly felt in places such as Ft. Nelson and High Level, but even in more remote points the active oil search has provided additional employment outlets e.g. for bulldozer operators, and requires local expeditors, accommodation facilities for transients, etc.

The incredibly rich Athabasca oil sands* in the southeast came into limited (45,000 bbl/day) commercial production by one plant in the fall of 1967 at Ft. McMurray following an investment of $235 million (nearly three-quarters of the national investment in the St. Lawrence Seaway development). The leased area covers only one-twentieth of one per cent of the total deposit, but contains sufficient oil sands to keep the plant operating for 30 years at the approved rate of production! The old town of Ft. McMurray, 20 miles south of the plant, trebled in size within three years to 3500 and is expected to add a further 1500 residents before levelling off. During the same three years the town budget jumped from $100,000 to $1.25 million.[10]

Clearly the landscape is being markedly affected by the mineral industry in the Northwest, and the inhabitants of the area are increasingly dependent upon it directly or indirectly. Clearly also there has been a postwar shift from precious metals to industrial and base metals and to fuels. Development in these latter categories is dependent not only upon very large ore quantities

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* Many estimates suggest that the oil sands contain as much petroleum as the combined reserves of all the world's known oil reserves. "Published estimates of the oil reserves that constitute the deposit have ranged between 100 and 300 billion barrels of oil in place." (Alta. Oil and Gas Conservation Board, in Report of Roy. Commis. on Development of Northern Alberta, Edmonton, 1958, 61) A recent report states that "the tar sands are a source of more than 600 billion barrels of synthetic crude oil" (Our Sun, 32 (3), Autumn, 1967, 1).

Even the exploration phase of the work plan a significant role in the area. Palmie Lime and stone Pacific cross-cross are landmarks and have opened up new metals to local exploration in many areas. Though the areas are usually self-contained and mainly supplied directly from overseas points there are significant benefits to local communities. This has been particularly felt in areas such as Fr. Sabre and Sir Lucas, but even in more remote areas where the active oil search has provided additional employment outlets e.g. for building materials, and requires local "amenities, accommodation facilities for transients, etc.

The industrial risk attaches oil analys* to the environment was later limited (A3,000 bbl/day) commercial production by was plant to the tail of 1967 as Fr. Sabre's failure to investment of $15 million (mainly storage-quarters of the national investment in the Fr. Lucas Heavy development). The leased area covers only non-trivial of our per cent of the total Lessee, but contains sufficient oil seeds to keep the plant operating for 30 years at the approved rate of production. The old term of 21, however, is also enough of the plant, treated in five yields three years to 2000 and is expected to add a further 150 petabarrs before levelling off. During the same time years the very budget jumped from $15,000 to $1.15 million.[10]

Clearly the industry is very heavily affected by the mineral industry in the Territory, and are industries of the area are interestingly dependent upon it directly or indirectly. Clearly also there has been a marked shift from previous metals to industrial and base metals and to fuels. Development in these latter categories is dependent not only upon very large-scale transition

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* Many authorities assert that the oil leads points as such particular as the combined pressure of all the world's bases oil reserves. "Published estimates of the oil reserves that constitute the Lucas Sabre range between 500 and 700 billion barrels of oil in place." (Lida, 1971 and the Conservation Sect. in Energy of Ter. Canada, ex Transl/cost of Terrace Alberta, Edmonton, 1970, 41) A recent report states that "the Ter sands are a source of more than 400 billion barrels of synthetic crude oil." (Ibid Ter. 97 (2). Lucas, 1967, 1).

of high quality or great ease in recovery, but also upon cheap and efficient transportation. While gold or even uranium can be flown out from the mine, the same is not true of lead or copper. Size of mining investment increasingly promises relatively long life expectancy for the new communities established, but it does not remove the fact that all mines eventually close and the communities must have other assets or they will die. The mineral industry of the Northwest has been geared to continental rather than to national markets for some decades. We now are seeing it move into global markets, particularly those of Japan. The Uranium City experience dramatically illustrates the risks as well as the advantages of complete dependence on external markets unless there are alternative employment opportunities.

Most alternative resources for the Northwest are limited. Forests appear to offer the greatest opportunities but for commercial potential are probably limited to northern Alberta, northeastern British Columbia, southeastern Yukon, and the Liard and Slave valleys in the Mackenzie District. To date except for some limited cutting for lumber in the southern fringes or near individual communities, timber operations are not present in the forest landscape. The traditional antipathy between forester and mining man is well known. Though the extent to which burnt-over landscape in parts of the north is due to human or natural agencies is debatable, it must be conceded that the prospector does not regard it as a major calamity.

Commercial fishing occurred on the lakes in the southern sector of the Mackenzie area before World War Two, but it was not until the postwar years and the coming of the Mackenzie Highway that this activity appeared on Great Slave Lake. This is now the major production area, with its main base at Hay River. In recent years about five and a half million pounds of whitefish

and lake trout a year worth about $1 million pass through the plants there to be exported, mainly fresh, to eastern United Stat es cities. The Commercial fisherman is a part of the landscape or "lakescape" both summer and winter, in boats and portable cabins respectively. Income from this resource has been particularly important to some of the native residents, but it is seasonal and can not provide sufficient income alone to support them at an acceptable standard.

Tourism has become a significant element in the economy of the Northwest in postwar years. To-day it is second only to the mineral industry in importance. The wilderness landscape becomes a more and more precious commodity as population densities increase elsewhere on the continent. Numerous hunting and fishing lodges now capitalize upon this, in many cases even providing their own air services to the lodges. Guiding and other lodge services provide a major source of cash income for Indian residents even in some of the most remote settlements e.g. Ft. Franklin on Great Bear Lake.[11] The Yukon capitalized on this new economic resource sooner, thanks to the Alaska Highway and its position to draw on the considerable traffic to and from Alaska. The growing road net throughout the area is particularly encouraging to the vacationing motorist. Indeed one of the major problems is to provide enough campgrounds, provisioning services, accommodation, etc.--a problem aggravated by the relatively short tourist season, though this is not quite as serious on the Alaska Highway. The Prosperous Lake Campground, some 20 miles east of Yellowknife, with its picnic tables and cement fireplaces with cut firewood, is an indication of how rapid has been this development and how far the transformation of the Northwestern landscape has gone, at least in places.

and Lake Erwan a year north about 21 miles down through the plateau region to be essential, mainly fresh, or nearly fresh water to drink. The Commercial fisheries is a part of the landscape or "atmosphere" both summer and winter, in boats and paddling canoes respectively. Leaves from this region appears has been particularly important, both at the native villages, but it is unknown and can not provide sufficient income alone to support plant as an industrial standard.

Twelve has become a significant element in the economy of the Tarkine area in greater years. To-day it is second only to the mineral industry in importance. The wilderness landscape however a core and more positive economy as physiotic Australia increasing attention to this potential. Numerous hunting and fishing lodges now capitalise upon this, in most cases they provide a major source of food income for local residents even in some of the most remote settlements e.g. Ta. Tunnelin in Tiger Snake Lake. The Tarkine capitalised on this new economic resource around, during to the Alaska Tourney and its position to draw on the commercial activity to and from Alaska. The growing land has diversified the area to particularly noteworthy in the mountaineering market. Tasmania one of the under positions is an growing energy consumption, population growth, increasing, etc.,—a problem recognised by the relatively short tourist season, though this is not unique to regions on the Alaska Tourney. The Freycinetia Lake Campground, some 20 miles east of Tailenbrife, with its plants tables and toilet facilities with air flushed, is an indication of how rapid has been this development and how far the transportation of air Tasmanian landscape has come, or indeed is going.

It perhaps should be noted in passing that catastrophic change in landscape as a result of natural factors is not unknown in the area, at least locally, e.g. the disastrous floods on the lower Hay River in 1963 and the tragic landslides at Ft. Smith in 1968. Whether the unprecedented low water on the Mackenzie system in 1968 was due to natural causes or to construction of the Portage Mountain dam on the Peace River is not settled, but it greatly curtailed shipping operations and appears to threaten the very survival of much of the fish and wildlife of Lake Claire and the west end of Lake Athabasca.

As elsewhere in the world, economic and social change is reflected most strikingly in the settlements. All Canadian communities have changed greatly in the postwar years. Many of them being larger centres, perhaps have a more impressive record in absolute statistics, but few of them can demonstrate as major a change in the character of the communities as those of the Northwest. In some cases they did not even exist in 1946 (Uranium City, Pine Point, Cassiar, Inuvik, etc): in a few cases, mainly individual mine, they have ceased to exist; in many cases they have made the jump from the era of fur trading to the era of motor vehicles, jet aircraft, and transistor radios--a change in less than a quarter century which required one or two centuries elsewhere.

The growth of the older communities, a trend encouraged long ago by the missions and later by expanding government services, has continued in the postwar years. It has been furthered by the general economic decline of the fur trade, so that the landscape has never been as empty of native residents as in recent years--almost all have 'moved to town'. Regrettably for many there has been no alternative source of income save on a casual basis, since woodland

It perhaps should be noted in passing that antipathetic change is inevitable as a result of natural factors in not without in the area, at least locally, e.g. the disappearance (locally) of the lower Bay River in 1911 and its tragic localization at St. Keith in 1917. Further the unprecedented low water on the Tuscarora system in 1948 was due to natural causes or to construction of the Portage Mountain dam on the Peace River is not settled, but it greatly important although questions and answers in studying the very complexity of much of the fish and wildlife of lake district and the river and of lake sidewater.

As elsewhere in the world, economic and social change is inevitable and certainly in the antipodes. All Canadian communities have changed greatly in the postwar years. Many of them having larger economy, perhaps have a more interesting record in absolute statistics, but few of them can demonstrate as major a change in the character of the community as some of the Saskatchewan. In some cases they did not even exist in 1945 (Meadow Lake, Pine Point, Chapter, Ituvik, only in a few cases, small individual stores, also have appeared to exist; in many cases they have made the jump from 100 or so to creeping to the era of motor vehicles, for airport, and transitory rather--a change in less than a quarter century which requires one or two generations elsewhere.

The growth of the older communities, a trend mentioned long ago in the studies and later by economic geographers elsewhere, has continued in the postwar years. It has been furthered by the general economic decline of the fur trade, so that the Indians are never had do most of their residents as in recent years--almost all have "moved to town". Incentively for some there has been an alternative source of income more in a recent years, since wondered

skills are not saleable to-day and few have much else. Government welfare payments, it must be conceded, form the major source of income in many of the communities. Meanwhile, a major effort to provide the best educational opportunities for the children has seen impressive school facilities appear in most communities, with residences for both pupils and teachers. The log cabins and shacks in which most Indian and Metis people lived in the settlements are gradually being replaced by newer homes with government grants and assistance. Services and utilities are being introduced. Thus the settlements grow, but all too often with no real economic base. Whitehorse and Yellowknife have profited greatly from their postwar promotions to territorial capitals, thereby broadening their economic base, but the role of government is more questionable in perpetuating some other communities where no alternative base any longer exists and which possess no potential situation advantages for modern needs. In communities where a viable economic base does exist, the dominant European population frequently has little in common with the native, and makes little real effort to bridge the understanding gap. Cultural stratification is reflected all too often in native 'ghetto' areas in northern communities and contributes to the serious social problems.

The sites of many settlements while satisfactory for the fur trade, often are not suited to present day needs, e.g. Ft. Simpson. Where a new community is needed, often in connection with a mining development or in some cases for transportation needs, it is possible to select the new site after having carefully considered all factors. The experience in such places as Uranium City, Pine Point, Cassiar, Clinton Creek (and it is expected, at Faro for the Anvil mine) has been generally favourable, and economic development

has been possible with consideration for practical and aesthetic values in the landscape. Where a need arises but a previous community existed, the result is often a grafted structure, with mixed results, such as the functional but unimaginative "new town" at Yellowknife, or the conditions at Ft. McMurray or at Whitehorse. The alternative, of a complete relocation of the older community was tried with Aklavik when Inuvik was established with even more mixed results. The relative merits for many northern communities of a more expensive and less attractive but older established site versus a complete relocation to a more functional and attractive site need to be thoroughly examined.

Over the postwar years we have made considerable progress in building techniques for the erection of new buildings in the Northwest, whether in new or in pre-existing communities. This is particularly true in overcoming many of the difficulties which permafrost creates in the area. Government research into the ground condition has assisted in overcoming many expensive building problems, and has contributed many striking structural features in the urban landscape of the northwest--buildings perched on pilings, utilidors, etc. Regrettably we have not developed a comparable architectural advance. The two largest centres and territorial capitals, Whitehorse and Yellowknife, now have paved streets and multi-storey buildings including elevators, but they are simply southern Canadian towns moved north. How much more interesting and probably functional they would be if we made a real attempt to evolve a northern architecture for the local needs. While the utilidor maze at Univik is an engineering achievement for the site it can scarcely be regarded as a work of art.

has been possible with considerable [illegible] and material gains in the landscape. Where a need arises but a previous community existed, the result is often a crafted structure, with mixed results. Such as the functional but unimaginative [illegible] or [illegible] or it [illegible]. The alternative, of a complete relocation of the older community was tried with [illegible] when Tuvik was established with more mixed results. The relative merits for many northern communities of a very expensive and less attractive but older established site versus a complete relocation to a more functional and attractive site need to be thoroughly examined.

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We must recognize that the northerner, like the southern Canadian, is becoming increasingly a town dweller. Admittedly also he has a long way to go yet to match the Canadian average. In 1966 43% of the population of the Yukon and the Northwest Territories was classed as "urban" compared with the national average of 74%. While it is unlikely that the size of the northern cities and towns will ever be as great as those in the south much the same trend will occur.* In the long run there probably will emerge a very few larger main centres, from which more temporary "outcamps" will operate on a temporary basis. Intermediate sized communites probably will continue for varying time, but in the long run may well disappear.

Let me close however on a similar note to that on which I began. There remains a vast amount of the Yukon and Mackenzie landscape that is still in a relatively unchanged condition. One should bear in mind that in 1966 the total population of the Yukon Territory was 14,382 (slighly more than that of Trenton, Ontario, and about the same as that of Swift Current, Saskatchewan); that of all of the Northwest Territories was 28,738 (slightly less than that of Timmins, Ontario and slightly more than that of Red Deer, Alberta); and that the combined total of both territories (43,130) was about the same as the population of St. Boniface, Manitoba. Man is still present in very few numbers in this vast area. Landscape remains a fresh unspoiled asset of the Northwest over much of its area and it is to be hoped that it will so continue. "Change" need not be synonymous with "destruction".

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* Whitehorse's population in 1966 was only 4771 and that of Yellowknife 3741; recent estimates are 6000 and 5000 respectively.

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